

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : David Q. Wright
Filed : January 24, 2002
For : PLANARIZING MACHINES AND METHODS FOR
MECHANICAL AND/OR CHEMICAL-MECHANICAL
PLANARIZATION OF MICROELECTRONIC-DEVICE
SUBSTRATE ASSEMBLIES

Docket No. : 108298508US1

Date : January 24, 2002

Box Patent Application
Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Commissioner:

In keeping with 37 C.F.R. § 1.121(b) and (c), this paper includes a clean version of the added specification paragraph and the entire set of pending claims upon entry of this amendment. Please amend the application as follows and reconsider the application in light of the following remarks.

In the Specification:

Please add a new section directly before the "Technical Field" as follows:

CROSS REFERENCE TO RELATED APPLICATION

This application is a divisional of pending United States Patent Application No. 09/565,639, filed on May 4, 2000.

204210-00525001

In the Claims:

Please cancel claims 1-31.

1. (Canceled)
2. (Canceled)
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31. (Canceled)

32. A planarizing machine for mechanical and/or chemical-mechanical planarization of microelectronic substrates, comprising:

a table having a support surface;

a fixed-abrasive planarizing pad on the support surface of the table, the fixed-abrasive pad having a planarizing medium with an abrasive planarizing surface, the planarizing medium comprising a binder and a first plurality of abrasive particles fixedly attached to the binder, wherein at least a share of the first abrasive particles are exposed at the planarizing surface;

a carrier assembly having a head for holding a substrate assembly and a drive mechanism for moving the head relative to the planarizing pad;

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a first supply of an abrasive first planarizing solution coupled to a dispenser positionable over the planarizing pad, wherein the first planarizing solution has a liquid and a second plurality of abrasive particles suspended in the liquid;

a second supply of a second planarizing solution coupled to the dispenser, wherein the second planarizing solution is a non-abrasive solution without abrasive particles; and

a computer operatively coupled to the first supply of the first planarizing solution and the second supply of the second planarizing solution, the computer having a computer-readable medium containing a computer-readable program code that causes the computer to (a) effect a first flow of the first planarizing solution to the dispenser at a first stage of a planarizing cycle of a microelectronic substrate, and (b) effect a second flow of the second planarizing solution to the dispenser at a second stage of the planarizing cycle after the first stage.

33. The planarizing machine of claim 32 wherein the computer-readable program code comprises causing the computer to open a first valve coupled to the first supply during the first stage to dispense a fixed volume of the first planarizing solution onto the planarizing pad before rubbing the microelectronic substrate against the planarizing pad.

34. The planarizing machine of claim 32 wherein the computer-readable program code comprises causing the computer to open a first valve coupled to the first supply during the first stage to effect the flow of the first planarizing solution onto the planarizing pad and then to close the first valve to terminate the flow of the first solution before rubbing the microelectronic substrate against the planarizing pad.

35. The planarizing machine of claim 32 wherein the computer-readable program code comprises causing the computer to open a first valve coupled to the first

supply during the first stage to effect the flow of the first planarizing solution onto the planarizing pad while rubbing the microelectronic substrate against the planarizing pad before the second stage.

36. The planarizing machine of claim 32 wherein:

the computer-readable program code comprises causing the computer to open a first valve coupled to the first supply during the first stage to effect the flow of the first planarizing solution and then to close the first valve to terminate the flow of the first planarizing solution; and

the computer-readable program code comprises causing the computer to open a second valve coupled to the second supply during the second stage to effect the flow of the second planarizing solution after terminating the flow of the first planarizing solution.

37. The planarizing machine of claim 32 wherein:

the computer-readable program code comprises causing the computer to open a first valve coupled to the first supply during the first stage to effect the flow of the first planarizing solution; and

the computer-readable program code comprises causing the computer to open a second valve coupled to the second supply during the second stage to subsequently effect the flow of the second planarizing solution while continuing the flow of the first planarizing solution to deposit a combination of the first and second planarizing solutions on the planarizing pad.

38. The planarizing machine of claim 32 wherein:

the computer-readable program code comprises causing the computer to open a first valve coupled to the first supply during the first stage to effect the flow of the

first planarizing solution and then to close the first valve to terminate the flow of the first planarizing solution;

the computer-readable program code comprises causing the computer to open a second valve coupled to the second supply during the second stage to effect the flow of the second planarizing solution after terminating the flow of the first planarizing solution during an opening phase of the second stage; and

the computer-readable program code comprises causing the computer to re-open the first valve to re-effect the flow of the first planarizing solution upon detecting a surface condition of the substrate at a subsequent phase of the second stage of the planarizing cycle.

39. The planarizing machine of claim 32 wherein the first abrasive particles in the planarizing medium and the second abrasive particles in the first planarizing solution have the same composition.

40. The planarizing machine of claim 32 wherein the first abrasive particles in the planarizing medium have a first composition and the second abrasive particles in the first planarizing solution have a second composition different than the first composition.

41. The planarizing machine of claim 32 wherein the first abrasive particles in the planarizing medium have a first size and the second abrasive particles in the first planarizing solution have a second size different than the first size.

42. The planarizing machine of claim 32 wherein the first abrasive particles in the planarizing medium have a first shape and the second abrasive particles in the first planarizing solution have a second shape different than the first shape.

43. A planarizing machine for mechanical and/or chemical-mechanical planarization of microelectronic substrates, comprising:

a table having a support surface;

a fixed-abrasive planarizing pad on the support surface of the table, the fixed-abrasive pad having a planarizing medium with an abrasive planarizing surface, the planarizing medium comprising a binder and a first plurality of abrasive particles fixedly attached to the binder, wherein at least a share of the first abrasive particles are exposed at the planarizing surface;

a carrier assembly having a head for holding a substrate assembly and a drive mechanism for moving the head relative to the planarizing pad;

a first supply of an abrasive first planarizing solution coupled to a dispenser positionable over the planarizing pad, wherein the first planarizing solution has a liquid and a second plurality of abrasive particles suspended in the liquid;

a second supply of a second planarizing solution coupled to the dispenser, wherein the second planarizing solution is a non-abrasive solution without abrasive particles; and

a computer operatively coupled to the first supply of the first planarizing solution and the second supply of the second planarizing solution, the computer having a computer-readable medium containing a computer-readable program code that causes the computer to effect (a) a flow of the first planarizing solution to the dispenser at a first stage of a planarizing cycle of a microelectronic substrate, and (b) a reduction of a concentration of the first abrasive particles on the planarizing pad during a second stage of the planarizing cycle after the first stage.

44. The planarizing machine of claim 43 wherein the computer-readable program code comprises causing the computer to effectuate a flow of a non-abrasive second planarizing solution without abrasive particles onto the planarizing pad during the second stage of the planarizing cycle.

45. The planarizing machine of claim 44 wherein the computer-readable program code comprises causing the computer to terminate the flow of the first planarizing solution at the end of the first stage before effectuating the flow of the second planarizing solution at the commencement of the second stage.

46. The planarizing machine of claim 44 wherein the computer-readable program code comprises causing the computer to continuously maintain the flow of the first planarizing solution during the first and second stages of the planarizing cycle.

47. A planarizing machine for mechanical and/or chemical-mechanical planarization of microelectronic substrates, comprising:

- a table having a support surface;

- a fixed-abrasive planarizing pad on the support surface of the table, the fixed-abrasive pad having a planarizing medium with an abrasive planarizing surface, the planarizing medium comprising a binder and a first plurality of abrasive particles fixedly attached to the binder, wherein at least a share of the first abrasive particles are exposed at the planarizing surface;

- a carrier assembly having a head for holding a substrate assembly and a drive mechanism for moving the head relative to the planarizing pad;

- a first supply of an abrasive first planarizing solution coupled to a dispenser positionable over the planarizing pad, wherein the first planarizing solution has a liquid and a second plurality of abrasive particles suspended in the liquid;

- a second supply of a second planarizing solution coupled to the dispenser, wherein the second planarizing solution is a non-abrasive solution without abrasive particles; and

- a computer operatively coupled to the first supply of the first planarizing solution and the second supply of the second planarizing solution, the computer having a

computer-readable medium containing a computer-readable program code that causes the computer to effect the method of claim 26.

48. The planarizing machine of claim 47 wherein the computer-readable program code comprises causing the computer to effectuate a flow of a non-abrasive second planarizing solution without abrasive particles onto the planarizing pad during a second stage of the planarizing cycle.

49. The planarizing machine of claim 48 wherein the computer-readable program code comprises causing the computer to terminate the flow of the first planarizing solution at the end of a first stage of the planarizing cycle before effectuating the flow of the second planarizing solution at the commencement of the second stage of the planarizing cycle.

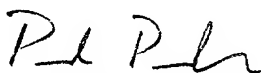
50. The planarizing machine of claim 48 wherein the computer-readable program code comprises causing the computer to continuously maintain the flow of the first planarizing solution during a first stage and a second stage of the planarizing cycle.

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REMARKS

Claims 1-31 have been canceled without prejudice. Claims 32-50 are presently pending. Applicant respectfully requests consideration of the application in view of this preliminary amendment. If the Examiner has any questions or matters that can be expediently handled by telephone, he or she is encouraged to contact Mr. Paul Parker at (206) 287-3258, attorney for the Applicant.

Respectfully submitted,
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